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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/812,416	03/30/2004	Tetsuzo Ueda	43890-673	1264

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Washington, DC 20005-3096

EXAMINER CRANE, SARA W
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ART UNIT 2811	PAPER NUMBER
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DATE MAILED: 10/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/812,416	<b>Applicant(s)</b> UEDA ET AL.	
	<b>Examiner</b> Sara W. Crane	<b>Art Unit</b> 2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1)  Responsive to communication(s) filed on 24 July 2006, 28 August 2006.
- 2a)  This action is **FINAL**.                      2b)  This action is non-final.
- 3)  Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4)  Claim(s) 1-39 and 50 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5)  Claim(s) \_\_\_\_\_ is/are allowed.
- 6)  Claim(s) 1-39, 50 is/are rejected.
- 7)  Claim(s) \_\_\_\_\_ is/are objected to.
- 8)  Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9)  The specification is objected to by the Examiner.
- 10)  The drawing(s) filed on \_\_\_\_\_ is/are: a)  accepted or b)  objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11)  The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12)  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a)  All    b)  Some \* c)  None of:
1.  Certified copies of the priority documents have been received.
  2.  Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3.  Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>28 Aug 2006, 24 July 2006</u> | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 112*

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-5 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for an AlN epitaxial film having 4H polytype, formed in contact with a substrate having 4H-type structure, does not reasonably provide enablement for any III-V Nitride semiconductor epitaxial form, so formed. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make the invention commensurate in scope with these claims.

As noted in the previous Office action, the specification teaches in a rather precise manner specific growth conditions that would allow for an AlN layer having the crystal structure as recited to be formed on the silicon carbide substrate as taught. There is no teaching of how to form other materials, other than AlN, with the recited crystal structure. Indeed, there is no indication in the specification that any other materials having the recited polytype have even been made, whether according to the method taught, or according to any modified method that could be discovered by one of ordinary skill without undue experimentation. Because conditions required for crystal growth are not in general predictable, and because one would not actually know whether a given material could even be formed with a given desired crystal structure

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until the experiment is actually performed, the teaching of one species of epitaxial film (AlN) would not provide enablement for the entire genus of III-V nitride semiconductor epitaxial films, as is now recited in claim 1.

Claims 6-29 and 50 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

As noted in the previous Office action, the specification details precisely how one would form an AlN layer with 4H-polytype on a 4H SiC substrate (page 11, lines 29-21, which teaches for example growth temperature, beam pressure, RF power, and nitrogen flow rate). The only teaching provided as to how one would produce subsequent layers is "by MOCVD" (page 11, line 23). With only this description to work with, one of ordinary skill would appear to require considerable experimentation, even undue experimentation, in order to produce epitaxial layers having the 4H-polytype as recited.

Applicant's representative states in the Remarks of 24 July 2006, "Once the initial stage is completed, the consecutive 4H-polytype AlGaN growth is easy for any alloy composition as long as the lattice mismatch is relatively small." This of course is the whole point. This statement may in fact be precisely correct. Or the statement may be entirely incorrect. (In general, growth of desired new crystal phases is not "easy" or

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predictable.) And there is no evidence of record to support the statement. Attorney remarks or arguments simply are not evidence. Perhaps this statement could be submitted in the form of a declaration, signed by one having skill in the art (even one of the inventors). Declaration evidence can be relied upon in a patentability decision.

### ***Conclusion***

Applicant's remarks of 24 July 2006 have been considered, but are not convincing. Applicant relies on the Kuroda reference to provide a teaching of growth of AlGa<sub>N</sub> having 4H-polytype on 4-H silicon carbide. This reference appears to be drawn only to growth of silicon carbide, and not to growth of AlGa<sub>N</sub>. There is no evidence of record to indicate that AlGa<sub>N</sub> could be grown under the same conditions as SiC, and indeed the growth of AlN having 4H polytype is set forth in the specification as Applicant's invention, and not the invention of anyone else. And the Sanyo reference of Kano Takahi does not appear to teach anything about the specific polytype of crystal.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not

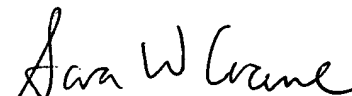
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mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to S. Crane, whose telephone number is (571) 272-1652.

The supervisor for Art Unit 2811, Eddie Lee can be reached on (571) 272-1732. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Sara W. Crane  
Primary Examiner  
Art Unit 2811